4: Joseph et al D, E-5 (1942-1943) 1949
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push the wide wooden slats together and lay blankets on them. Beds stand in the yard in summer, with the bedding rolled up during the day to keep it clean; in winter they are moved indoors.

Eating arrangements are also characteristically elastic. In the eastern districts, where every house has a table and chairs, family meals are the general practice, but no one is concerned if some member arrives late or not at all. Fiestas are the only occasions when group eating seems important.

No longer does the desert furnish all the food. Only two wild plants are still important in the Papago diet: the cholla bud and the fruit of the saguaro cactus. These plants are good sources of sugar, vitamins, and minerals.[1] Various seeds and wild greens are still gathered in season, but decreasing use of wild products has followed the introduction of stores on the Reservation, and Papago food is now rather like lower-class Mexican or Yaqui food. The usual three family meals each day are much alike in basic pattern: coffee, tortillas or bread, and some bean or other legume, which "makes the meal." These foods are supplemented by other vegetables and sometimes by meat, cheese, and eggs. Green corn is used in many forms—fresh, or dried and roasted and then ground for boiling alone or with black-eyed beans. Wheat is used in whole-wheat tortillas or bread and as pinole. Squash is boiled or baked, either fresh or dried, and several varieties of peas are also eaten. Principal meats in the diet are beef and chicken, but their use varies with the economic status of the family, for not all have cattle or poultry, and meat in the stores is expensive. Rabbits and other wild game provide additional meat.

The fiesta is the occasion when delicacies are set forth. Fiesta foods include tamales and beef stew, with raisin rice pudding or canned fruit for dessert. Baker's bread and cake are greatly esteemed. Food for the fiesta is carefully planned and prepared, and an effort is made to serve the choicest dishes. In the home, however, it is considered pure ostentation to set too good a table.

Many Papago children show signs of malnutrition,[2] as the modern Papago diet has deficiencies, the most serious of which is in vitamin C. In those seasons when fresh vegetables and wild greens are not available, the Papago eat very few foods which are rich in this vitamin; oranges and tomatoes are not grown on the Reservation and are expensive to buy. Nor is vitamin A very plentiful in the diet. Milk is used almost exclusively in coffee, and the total amount consumed is limited. School children must learn to drink milk, as many adults believe that undiluted it is bad for the stomach. As noted in

1. For a comprehensive study of Papago diet see Emma Reh, "An Economic Study of the Papago Indian Reservation, Arizona" (MS).

2. See Part III of the study.

4: Joseph et al D, E-5 (1942-1943) 1949
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chapter iii, most families who own cattle do little slaughtering for themselves and thus do not eat the organ meats and blood which were an important part of Papago diet in the old days. School lunches are helping to supply some of these dietary deficiencies, but experimentation and education will be necessary before home diets are improved.

THE PAPAGO HOUSEHOLD

The family is the most important unit in the Papago social structure, whether home is a tiny structure of wattle-and-daub or a five-room house with a shingle roof, wooden floor, refrigerator, washing machine, and radio. Family solidarity is strong. Most often, and ideally, a household consists of the old parents, unmarried sons and daughters, and married sons with their wives and children—three generations in all. But, since relatives may always be depended on for hospitality, the constitution of the household shifts as convenience and necessity require. Any relative is given a temporary or permanent place in the domicile as long as he is willing to assume his share of responsibility for the family livelihood and to fit quietly into the family structure. It is a rare household that does not include a widowed daughter, a distant cousin, a child whose parents have died or remarried; or an "illegitimate" child. Brothers or sisters of the old parents (also regarded as grandparents by their siblings' grandchildren)[3] may also be part of the family. Many and varied are the combinations of relatives who may live together.

Thus a Papago child is usually born into a family that includes not merely his father and mother and brothers and sisters but several other relatives. The precise combination does not signify. Whether his grandparents are maternal or paternal, whether the other adults are his aunts and uncles or more distant relatives, a child's family relationships are such that the absence of one particular relative is no deprivation, if there is another who can take his place. Both the child and his relatives are prepared to accept substitutes even in the essential roles.

Every relative, however, has his proper designation. Some kinship terms differentiate persons who would, in English, have a common appellation. Thus there is a different term in Papago for an uncle who is the mother's younger brother from one who is the father's older brother. On the other hand, the same terms are used for persons who are differentiated in English. Brothers and sisters and all degrees of cousins are called by one of two terms; these terms do not distinguish sex but rather the comparative ages of the speaker and

3. Siblings are children of the same parents.

4: Joseph et al D, E-5 (1942-1943) 1949
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for most parents to keep their offspring out of school. Thus, it is probable that the picture of average health obtained from the limited number of children available for examination would not have been essentially modified by including the children absent from school.

Had the great number of children who were away in the cotton fields been included in the results, the figures for common cold, bronchitis, and skin infections like impetigo would probably have risen, for it is known that such disorders are favored by the living conditions in these places. But, as with school attendance, absence for work in the fields has little connection with general health.

No epidemics of childhood diseases were reported during the period of the health survey, but, without question, single cases of acute illness in absentees escaped attention.

One hundred and thirteen children (58 boys and 55 girls) were thus examined. Of these, 73 lived in the eastern area, and 40 in the western. Table 2 illustrates the principal results obtained from the whole Papago group.

One impressive finding of the health examinations was the exceedingly small number of children in perfect health. Further, almost half the children (43.4 per cent) appeared underfed—were thin or emaciated. About the same percentage showed signs of malnutrition (i.e., vitamin deficiencies, etc). This figure is lower than it might have been if, with the aid of X-ray examinations, less manifest bone malformations caused by rickets had become evident. The great number of children with marked irregularity of the teeth leads to the suspicion that vitamin D deficiency may affect a greater number of children than those who displayed obvious signs of rickets in ribs and long bones (the only indications of vitamin D deficiency used in this study).

The next most common abnormality found was enlargement of tonsils. If to this figure are added those cases in which tonsils had been removed, the percentage of children who were suffering or once had suffered from chronically diseased tonsils rises from 41.6 to 59.3 per cent.

Over a third of the children showed symptoms of an acute cold, such as coryza, sore throat, and signs of bronchitis. This is rather a high figure but not surprising if it is remembered that the examinations took place from December to February, when nights are cold even in southern Arizona. In the mornings the children often climbed stiff and shivering from the school bus and rushed into the school to crowd around the stoves. Only rarely did they wear sweaters or coats; most of the boys wore the same denim overalls and thin cotton shirts as in the hottest summer months, and the girls had on light cotton prints over rayon panties and (occasionally) a slip.

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The incidence of other disorders does not seem remarkable. The children's teeth were bad, no doubt, but such findings referred mostly to milk teeth, while only a relatively small percentage of older children showed dental decay. 164

However, certain chronic diseases were apparent which, because they are contagious, would constitute a grave danger for any community, even though

TABLE 2

FINDINGS OF MEDICAL EXAMINATIONS
(In Percentages of Total Number Examined)

Condition	Total Group	Eastern Children	Western Children
Good health*	7.1	8.2	5.0
Good nutrition	56.6	49.3	70.0
Fair nutrition	25.7	34.2	10.0
Poor nutrition	17.7	16.4	20.0
Malnutrition†	44.2	50.7	32.5
Impaired vision	6.2	8.2	2.5
Active trachoma	17.7	17.8	17.5
Arrested trachoma	16.8	19.2	12.5
Irregular teeth	51.3	54.9	45.0
Caries	33.6	39.7	22.5
Enlarged tonsils	41.6	35.6	52.5
Removed tonsils	17.7	27.4	
Swollen lymph glands	23.9	21.9	27.5
Suspected tuberculosis (lungs)‡	9.7	8.2	12.5
Valvular heart disease	2.6	2.7	2.5
Impetigo and ringworm	7.1	6.8	7.5
Colds§	35.4	30.1	45.0
Children examined (no.)	113	73	40

[146]

* No impairment except occasional irregularity of teeth.
† Evidence of marked vitamin deficiency, such as rickets, bleeding or ulcerated gums, fissure at corners of mouth (see p. 178 for discussion of nutritional states).
‡ As suggested by auscultation and percussion.
§ Acute colds with such symptoms as coryza, sore throat, or bronchitis.

the incidence were comparatively low. In Papago communities water is scarce or can be obtained only with difficulty, and frequent washing of hands, body, and kitchen utensils is a luxury. Particularly in wintertime, most persons sleep close together in one room, usually in the same clothes worn during the day. In such communities the significance and danger of communicable diseases is commensurately heightened. [515]

For a number of years tuberculosis has been recognized as threatening the very survival of the Indian population of the United States. Among the Papago children studied, almost 10 per cent were suspected of tuberculosis of the lungs. If these suspicions were verified by means of longer observation,

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164 measles and whooping cough, which frequently end in pneumonia. We may assume that what has been established experimentally for human beings and animals in general applies to Papago children: namely, that undernourishment tends to increase susceptibility to infections and that vitamin deficiencies may favor or produce inflammatory or degenerative conditions in mucous membranes, skin, and nerves.

146 The average Papago diet is extremely monotonous and limited in its main components (see chap. iv). This statement, based upon occasional observations and general impressions, is substantiated by the results of a study of Papago food habits made in 1942 by the United States Bureau of Indian Affairs and the University of Chicago. The three villages in which food habits were analyzed were not included in the present research; but they are communities embracing three levels of typical economic status and acculturation, so that the applicability of the findings to the whole Reservation seems reasonably certain.

In the course of the diet study, the investigator (Emma Reh) listed sixteen foods used during an average week in the meals of a poor Papago family and twenty-seven items found in those of a rich family.[2] Several varieties of beans, wheat flour, corn, coffee, and sugar, with the occasional addition of meat in the prosperous family, constituted the bulk of the food. An analysis of the nutritional value of the average Papago diet (made by Michel Pijoan, M.D. on the basis of Miss Reh's findings) revealed that the average amount of calories ingested was sufficient but that there was a moderate insufficiency of calcium and a marked insufficiency in vitamins A and (particularly) C. Furthermore, only 21 per cent of the protein consumed was derived from animal sources, suggesting deficiency of some of the most valuable types of proteins.

Part of these findings were corroborated in 1943, when, independently of the above-mentioned research, examination of twenty-eight Papago school children revealed a pronounced insufficiency of ascorbic acid (vitamin C) in their diet. It was stated that "in some cases . . . certain stigmata of early scurvy can be found, such as bleeding gums, hemorrhagic diatheses about the ankles and heels, and loose teeth."[3]

All these findings suggest that Papago diet, which is largely dependent upon the limited agricultural resources of the desert and upon cultural traditions,

2. See Emma Reh, "An Economic Study of the Papago Indian Reservation, Arizona."

3. Michel Pijoan, C. A. Elkin, and C. O. Edinger, "Ascorbic Acid Deficiency among Papago Indians," *Journal of Nutrition*, XXV (1943), 444.

4: Joseph et al D, E-5 (1942-1943) 1949
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can indeed be considered inadequate, especially for children, who require more high-grade proteins and more vitamins than adults. 146

Another factor which may aggravate the conditions of undernourishment and malnutrition produced by the limitations of Papago diet is perhaps to be found in the general attitude of adult Papago toward their children. Recognition of the difference between the needs and reactions of the child and the adult, as far as it is determined by such factors as the physiological process of growth, does not seem to be part of the Papago pattern of training and guidance of children. This attitude seems to be fundamentally different from that predominant in modern white civilization, where a child is a being in development, an organism that has not reached its full strength and maturity and must be guided toward this goal even against its will. A child who prefers pickles to spinach will nevertheless have to eat more spinach. In front of her son who is crying angrily because he had to leave a toy and eat his oatmeal, the white mother stands serene and without feelings of guilt, convinced that she is acting for the child's own good. 146 858

The Papago do not ignore the facts of physiological maturity or immaturity. But, as in the art of the Middle Ages, where the child represented in his mother's lap looks like a miniature grown-up, the Papago child seems to be considered a small-sized man or woman, sexually immature but otherwise organically undifferentiated from the fully grown.

This matter will be dealt with at greater length in later chapters; here we are interested only in the effect of this attitude upon the children's health. The little men and women enjoy great freedom as to what and how much food they choose to eat, almost as soon as they are weaned from their mothers' breasts. Unwillingness to eat, a preference for a certain dish, or a refusal of others is to a great extent respected and indulged. In many cases this practice means a further restriction or increased imbalance of Papago diet—a restriction which favors undernourishment and malnutrition. In small children it often causes serious digestive disorders which play a considerable role in the high infant mortality (estimated at 258 per 1,000 live births as contrasted with 40.4 per 1,000 live births for the country as a whole). The right of self-determination seems to go still further. As soon as children are able to express their wishes, they are asked whether or not they desire medical treatment when they are ill. If they refuse to submit to treatment in spite of attempts at friendly persuasion, the matter is usually dropped, however grave and dangerous the illness. Probably there is a direct connection between this attitude and Papago magic beliefs and fear of the dead. Its influence upon the children's gen- [165]

4: Joseph et al D, E-5 (1942-1943) 1949
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146 858 eral health, upon mortality and the spreading of diseases, should not be underestimated.

With these considerations we have approached an area where Papago personality and psychological reactions intimately merge with and influence the state of the physiological organism. We shall now proceed to analyze the children's attitudes and responses toward their human and nonhuman environment. Then we may understand more fully the problems of physical health as they exist for the Papago and the medical problems and responsibilities which arise for the white administrators of this minority group.

7: Lumholtz N-5 (1909-1910)1912
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seemed able to live here. The prevalent vegetation was, as usual, greasewood with salt bushes now and then. Low sand dunes were visible here and there.

The Pimas of Kohatk I found to be good-tempered, affable people. The women cut their hair in front so as to have bangs and they are good-looking. These natives seem to be somewhat under Roman Catholic influence and have abandoned their native feasts. Photographing was as much detested here as elsewhere. The sight of my camera would make the children take to the woods and the old men hurriedly disappear on hands and knees into their dome-shaped huts.

I heard neither English nor Spanish spoken, but the inhabitants have adopted the frontier man's way of living, frying their meat in lard and adding quantities of it to their beans. They buy white flour and make unwholesome tortillas in boiling lard. This heavy, poorly cooked food forms their daily regime, without any variety. A small bucketful of coffee is distributed at meal-time both in the middle of the day and in the evening. They possess cattle but, like most white ranchers, are too lazy to milk the cows. The meals are appropriately served on plates of cheap crockery and cups bought in the white man's stores. The participants give audible evidence of consuming more lard than is good for them, and, were the facts known, "to be as dyspeptic as a civilized Indian" would be an adage. Think of the anomaly of leaving wholesome, natural, well-cooked dishes for a diet of lard and the cheapest kinds of canned goods.

Contrary to the universally accepted opinion, the cui-

½ [i.e., in the country between Awikam and Kohatk.—Au.]

7: Lumholtz N-5 (1909-1910) 1912
NU28 Papago NU28

sine of barbarous Indians is excellent. To be sure, they 252
have few dishes, but there is variety enough, and an important fact is that the food is never "killed," *i. e.*, overcooked, as is the all too common habit of the poor white man; the food retains a natural, pronounced flavor of its own, unknown to most whites, besides having all the life-giving elements. After all, nothing tastes as well as the simple things, well cooked. What is better than the whole wheat cakes of the Papago Indians of Sonora? They are nature's genuine gift to hungry men, furnishing at the same time extreme satisfaction to one's sense of taste. I know of an American who came across this dish fit for kings in a corner of Sonora, to whom it was such a revelation that he ordered two sacks of the flour to be sent to his distant home. The primitive Indian way of cooking beans in clay vessels without lard is unsurpassed for preserving the inherent flavor of the bean. No one can cook squash as my modest Indian hostess or make an *atole blanco* (thin gruel of maize) like hers; even the Mexican women cannot compete with her in this. The green corn that is offered in early autumn in fashionable restaurants in New York as a native delicacy ought to bring a blush of shame to the chef's cheeks, watery and devoid of flavor as it is.

Apart from the stultifying process of jumping literally, as the saying goes, from the frying-pan into the 252 146
fire in their effort to imitate the white man, there is a very sad feature connected with the abandonment of native dishes. Indigestion and a one-sided diet undermine the strong constitution of the Indian, enfeeble his [164]

7: Lumholtz N-5 (1909-1910)1912
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252 blood, and leave him with little power of resistance to
146 his great scourge, tuberculosis. According to my interpreter, who is an observant man, it is no uncommon occurrence among the Papagoes who have adopted the white's man's cooking, even to die from indigestion. Next to brandy, lard is the greatest curse civilized man has brought to the Indian.

After a warm and cloudy night we had the somewhat rare experience of four hours of rain in the forenoon. Still, in the afternoon, as the rain had not been so very heavy, we decided to return to Kukómalik, thinking we might get there in an hour and a half by driving a little fast. We made our way very well up to about a mile within our destination, when our horses began to encounter difficulties. The land here was slightly depressed and therefore retained the newly fallen rain as a reservoir on its alluvial soil. The ground became very soft, and finally, in spite of heroic efforts, our horses could pull no more. The night had overtaken us with darkness, deep as in Egypt of old. Pablo went to look for a team to pull us out, while I remained behind trying to light a candle which the insects aggressively put out. At ten o'clock the moon rose and made the outlook a little bit more cheerful.

A fresh team of Indian horses after a while came splashing through the water, but they proved inadequate for the task, and we had to camp where we were. The mud was of the kind of which adobe is made and stuck to our shoes like clay, but there was no necessity for walking around much. There were a few mezquite

8: Pijoan, Elkin & Eslinger D-5 (ca. 1942)1943
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262 pepo; Cucurbita moschata), dried chili (Capsicum annuum), a native spinach or pigweed (Ameranthus Palmeri), and whole [251] wheat and peeled wheat (Tricitum vulgare). The majority of these foods are dried for storage.

227 The Papagos utilize for consumption the available varieties 262 of cactus as they did aboriginally, gathering the fruits of the 252 cholla (Opuntia echinocarpa) and various other kinds of prickly pear (Opuntia spp.) and the sahuaro (Carnegiea gigantea). The fruits are eaten in large quantities during season and in most instances these are baked for 24 hours in pits partially filled with hot stones; the surplus is dried for storage. The sahuaro fruit is often prepared as a syrup or jam. The seeds of the cactus are dried and later these are ground into a meal from which they prepare a gruel. In most of their cooking the Papagos use quantities of fat, especially lard or vegetable shortening.

● 146 In general it can be said that the diet of these people is one rich in cooked carbohydrate, with occasional animal protein and, in rare instances, cooked green fruits or vegetables. The Papagos drink but little milk (except from the breast during infancy); most of the natives in the outlying districts drink no dairy milk at all. As a result of their diet numerous avitaminoses occur, superimposed one on the other; the deficiencies may be subclinical or threshold in character due to a continued shortage of vitamins in the diet.

ASCORBIC ACID STUDIES

114 Various studies in the literature indicate that the ascorbic 146 acid content of the plasma and the amount excreted are an index of the previous dietary intake (Belser, Hauck and Storvick, '39; Heinemann, '38). On the other hand, reports have appeared where the blood analyses themselves are used to determine the actual state of ascorbic acid nutrition (Minot, Dodd, Keller and Frank, '40). In some instances the blood and urine analyses have been supplemented by the determination of ascorbic acid in the dietary intake (Todhunter and Robbins, '40: Goldsmith, Ogaard and Gowe, '41). However, as Bessey and White ('42) have pointed out, the practical problem is one

8: Pijoan, Elkin & Eslinger D-5 (ca. 1942)1943
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which involves the dietary intake and the level of ascorbic acid in blood plasma. The dietary intake of ascorbic acid found necessary to maintain a plasma level of this organic acid has varied with the techniques used by investigators. Widenbauer ('37) determined that a daily intake of 22 mg. was necessary to maintain a fixed plasma ascorbic acid concentration; Hathaway and Myer ('41) reported 31 mg., and Bessey and White ('42) in careful studies of children arrived at the conclusion that 3 ounces of orange juice plus what was present in the diet seemed an ideal intake to maintain a level of presumably 40–50 mg. a day. It can be assumed, on the basis of such investigations, that from 30–50 mg. are required to sustain ascorbic acid economy. It is not the purpose of this communication to ascertain the ascorbic acid requirements of Papago Indians but rather to ascertain the amount of ascorbic acid in their food and the plasma level. At the onset we were intrigued by the frequent occurrence among the Papagos of the common finding of a hemorrhagic diathesis in their gums, and in some cases on the ankles and other portions of the body that were most subject to trauma. We felt that the disease of latent or subclinical scurvy was a possibility among these people and that this deficiency might be responsible for its numerous insidious effects.

The method of assay for plasma ascorbic acid was that of Mindlin and Butler ('38) but without the use of cyanide; and that described by Bessey ('38) for foods. Two groups of children, from 6 to 15 years of age, were studied: a group at the Sells School where school lunches are provided, and a group in an isolated community known as Cowlic. School children were used because they were more acculturated and cooperative, the adults being quite primitive and to a greater degree intractable and less amenable to study.

The plasma ascorbic acid findings among twenty-eight children were as follows: one child had a value of 0.660 mg. per cent, which was the highest content observed; two had values of 0.528 mg. per cent, and the rest varied from the lowest ascorbic acid content of 0.264 mg. per cent to 0.396 mg. per cent.

8: Pijoan, Elkin & Eslinger D-5 (ca. 1942)1943
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146 In view of the fact that a plasma level of 0.8 to 1.0 mg. per cent appears to be the normal range for medical students (Pijoan and Klemperer, '37), the values expressed in the foregoing paragraph are low enough to indicate a continued shortage of this vitamin in the diet. Furthermore, the subjects studied were those in whom no wasting or progressive debilitating disease could be found. In short, it would appear that these subjects were good candidates for the study of vitamin C nutrition.

146 262 In the Papago village of Cowlic, the diet is low in ascorbic acid. It consists predominately of beans and home-made bread together with meat occasionally (possibly once a week, and used as a seasoning), and occasionally cooked pumpkins and cactus fruits.

146 No ascorbic acid was found in our assays of all of the various types of uncooked and cooked beans, corn, peas and dried cactus seeds. The only sources of ascorbic acid we are aware of in the Papago diet are as follows (in milligram per 100 gm.): Sahuaro cactus fruit 3.52; dried red chile 14.46; dried cactus buds (cholla) 1.48; spinach (pigweed) 3.72; wheat flour 2.7; and squash 2.75. Since most of these foods are consumed after they have been cooked, and since no "cooking time" (by boiling) was less than 20 minutes on the part of the natives, the same foods (2-gm. samples in 15 cc. water) were subjected to boiling (97°C., alt. 5600 feet) for 20 minutes. The ascorbic acid content in milligram per cent weight plus that in the water used for cooking was as follows: Sahuaro cactus fruit 1.76 mg., dried red chili 9.57 mg., dried cactus buds 1.16 mg., spinach (pigweed) 1.32 mg., wheat flour 1.5 mg., and squash 1.2 mg. Other foods consumed contained values as follows: bread 1.7 mg., and Sahuaro cactus fruit syrup 8.96 mg.

In a diet consisting essentially of cooked carbohydrate, where chili and other ascorbic acid-containing foods are only incidental, the ascorbic acid content never exceeds 15 mg. a day and is, generally speaking, on an average of about 5 mg. a day. Bleeding of the gums occurs in 70% of the Indians, and pyorrhoea is present in all the older adults examined.

8: Pijoan, Elkin & Eslinger D-5 (ca. 1942) 1943
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Ascorbic acid insufficiency may presumably be a cause for such findings. Saturation studies with determinations of the urinary excretion are impractical in field work and in our opinion the circumstances would introduce a considerable source of error.

DISCUSSION

Among Papago Indians there is an obvious insufficiency of ascorbic acid in the diet. The plasma levels of ascorbic acid in the Papago Indians studied are in general not those characteristic of scurvy but indicate rather the beginning of subclinical scurvy. In some cases where the value is below 0.3 mg. per cent, certain stigmata of early scurvy can be found, such as bleeding gums, hemorrhagic diatheses about the ankles and heels, and loose teeth. The other vitamin deficiencies present somewhat confused the clinical picture. This was found to be the case also among Shoshone and Taos Indians, as well as among Spanish Americans (Pijoan and Eggan, '43). These people have dietary food patterns which have points of similarity, namely, that carbohydrates and proteins are derived largely from cooked legumes. The body economy as studied by Pijoan and Eggan ('43) is a poor one and the numerous deficiencies form vicious circles involving infections. The introduction of synthetic vitamin preparations or foods foreign to their culture has been attempted and their use is of short duration, as such preparations have no cultural significance and the medical results are slow and undramatic. The solution of the problem of ascorbic acid nutrition among Papago Indians so far evades us. Among certain peoples where citrus fruits, tomatoes and strawberries are part of their culture, the increased use of such foods as a curative measure of a deficiency is a simple one. In other areas, such as Taos, New Mexico, decoctions of pine needle juice or chili juices can supply the necessary ascorbic acid and their use can fit into the acculturation process. No plants having a high ascorbic acid content can be found in the Papago reservation, even though the use of green peppers or seed sprouts might play a role in increasing the source of ascorbic acid. From a nutritional point of view the problem is a provocative one and merits attention.

8: Pijoan, Elkin & Eslinger D-5 (ca. 1942)1943
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CONCLUSION

Papago Indians have an inadequate intake of ascorbic acid in their dietary food pattern and a resulting low plasma level. The nutritional and cultural aspects of this problem are discussed.

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